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WOOD ANATOMY OF THE NEOTROPICAL SAPOTACEAE XXXV
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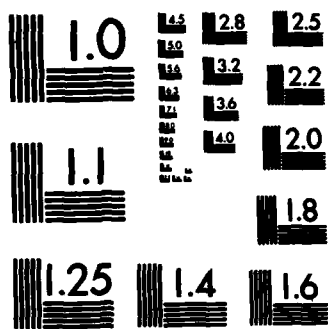
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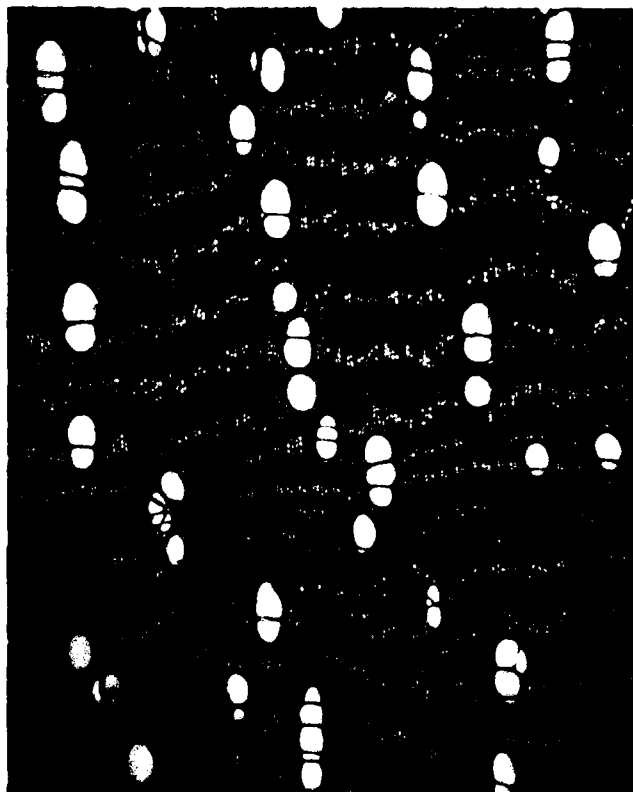
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**WOOD ANATOMY
OF THE
NEOTROPICAL SAPOTACEAE
XXXV. URBANELLA**

RESEARCH PAPER FPL 423

FOREST PRODUCTS LABORATORY
FOREST SERVICE
U.S. DEPARTMENT OF AGRICULTURE
MADISON, WIS.

OCTOBER 1982



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Abstract

Urbanella was described in 1890 but has remained submerged as a section of Calocarpum or as a synonym of Pouteria to the present day. Aubréville reinstated Urbanella in the early 1960's while Baehni maintained Calocarpum with Urbanella reduced to synonymy. Urbanella and Calocarpum have many features in common but can be readily separated by means of the parenchyma arrangement that is banded in Urbanella and reticulate in Calocarpum. Both genera have an unusually high silica content.

Preface

The Sapotaceae form an important part of the ecosystem in the neotropics; for example, limited inventories made in the Amazon Basin indicate that this family makes up about 25 percent of the standing timber volume there. This would represent an astronomical volume of timber but at present only a very small fraction is being utilized. Obviously, better information would help utilization--especially if that information can result in clear identification of species.

The Sapotaceae represent a well-marked and natural family but the homogeneous nature of their floral characters makes generic identification extremely difficult. This in turn is responsible for the extensive synonymy. Unfortunately, species continue to be named on the basis of flowering or fruiting material alone and this continues to add to the already confused state of affairs.

This paper on Urbanella is the thirty-fifth in a series describing the anatomy of the secondary xylem of the neotropical Sapotaceae. The earlier papers, all by the same author and under the same general heading, include:

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| I. Bumelia--Res. Pap. FPL 325 | XVIII. Gomphiluma--Res. Pap. FPL 362 |
| II. Mastichodendron--Res. Pap. FPL 326 | XIX. Chromolucuma--Res. Pap. FPL 363 |
| III. Dipholis--Res. Pap. FPL 327 | XX. Manilkara--Res. Pap. FPL 371 |
| IV. Achrouteria--Res. Pap. FPL 328 | XXI. Barylucuma--Res. Pap. FPL 372 |
| V. Calocarpum--Res. Pap. FPL 329 | XXII. Pradosia--Res. Pap. FPL 373 |
| VI. Chloroluma--Res. Pap. FPL 330 | XXIII. Gayella--Res. Pap. FPL 374 |
| VII. Chrysophyllum--Res. Pap. FPL 331 | XXIV. Ecclinusa--Res. Pap. FPL 395 |
| VIII. Diploon--Res. Pap. FPL 349 | XXV. Ragaia--Res. Pap. FPL 396 |
| IX. Pseudoxythece--Res. Pap. FPL 350 | XXVI. Myrtiluma--Res. Pap. FPL 397 |
| X. Micropholis--Res. Pap. FPL 351 | XXVII. Sarcaulis--Res. Pap. FPL 398 |
| XI. Priurella--Res. Pap. FPL 352 | XXVIII. Labatia--Res. Pap. FPL 416 |
| XII. Neoxythece--Res. Pap. FPL 353 | XXIX. Eglerodendron--Res. Pap. FPL 417 |
| XIII. Podoluma--Res. Pap. FPL 354 | XXX. Pseudocladia--Res. Pap. FPL 418 |
| XIV. Elaeoluma--Res. Pap. FPL 358 | XXXI. Pouteria--Res. Pap. FPL 419 |
| XV. Sandwithiodoxa--Res. Pap. FPL 359 | XXXII. Richardella--Res. Pap. FPL 420 |
| XVI. Paralabatia--Res. Pap. FPL 360 | XXXIII. Englerella--Res. Pap. FPL 421 |
| XVII. Gambeya--Res. Pap. FPL 361 | XXXIV. Franchetella-Eremoluma--Res.
Pap. FPL 422 |

Publication in this manner will afford interested anatomists and taxonomists the time to make known their opinions and all such information is hereby solicited. At the termination of this series the data will be assembled into a comprehensive unit.

WOOD ANATOMY OF THE NEOTROPICAL SAPOTACEAE

XXXV. URBANELLA

By

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U.S. Department of Agriculture

Introduction

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Urbanella was described by Pierre in 1890 based on Lucuma procera Martius from eastern Brazil, which became the generic type Urbanella procera (Martius) Pierre. Concurrently, Pierre described two new species, U. buchananiaefolia from the Peruvian Amazon and U. oblonga from Martinique. Within a few years these species were reduced to sectional status in the allied genus Calocarpum.

Aubréville (1)^{3/} was uncertain regarding the generic status of Urbanella and included it under Calocarpum in his key to the Poutériées. Later, Aubréville (3) included Urbanella in his key to the Sapotaceae but as a "poorly known genus." Baehni (4) accepted Calocarpum as a valid genus but made Urbanella a synonym. Cronquist (5) reduced Calocarpum to a synonym of Pouteria as did Pilz (7), the most recent student of the family.

The woods of Calocarpum and Urbanella are quite similar in their physical appearance, but can be readily separated on the basis of parenchyma arrangement alone, which is reticulate in Calocarpum and banded in Urbanella. Additional differences are to be found in the ray height and intervessel pitting.

Description

General: Wood brown to dark brown, dull and lusterless. Specific gravity average of 0.83 with the individual specimens ranging from 0.65 to 0.96. Growth rings lacking or very indistinct. Bark dull red brown, very fine

^{1/} Pioneer Research Unit, Forest Products Laboratory.

^{2/} Maintained at Madison, Wis., in cooperation with the University of Wisconsin.

^{3/} Underlined numbers in parentheses refer to literature cited at the end of this report.

textured and apparently not laminated, 5-12 mm thick. Outer bark surface gray when cork cells are exposed, otherwise dull red brown. Froth test negative.

Anatomical:

Pores essentially diffuse in most species (fig. 1); tending to radial or clustered echelon arrangement in procera (fig. 3). Solitary pores present but most commonly in radial multiples of 2-4 (5), infrequently to 7-8. Maximum pore diameter of individual specimens ranging from 102 μm (procera) to 173 μm (excelsa) with an average of 149 μm .

Vessel member length averages 700 μm for all specimens, ranging from 580 to 860 μm in individual specimens. Tyloses thin-walled when present. Intervessel pitting mostly in the 4-6 μm diameter range.

Axial parenchyma more or less regularly banded; the individual bands irregularly 1-3 (4) seriate. Cells with or without brown contents. Silica particles present and confined to cells with brown contents. Rhombic and microcrystals not observed.

Wood rays 1-3 occasionally to in-part 4-seriate; heterocellular (figs. 2,4). The maximum body height of the multiseriate portion ranges from 118 to 473 μm with an overall average of 288 μm . Commonly with brown contents. Vessel-ray pitting irregular in shape and size but commonly linear or obovoid. Silica particles common: spheroidal; attaining diameters of 20-30 μm ; present in all ray cell types. Rhombic and microcrystals not observed. Pitting on lateral walls of square and erect marginals distinct and abundant.

Wood fibers moderately thick-walled; ranging in length from 1.03 to 1.69 mm with an overall average of 1.45 mm. Vascular tracheids present in all macerated material but frequently not detectable in prepared slides.

Silica content determined by chemical analysis ranges from 0.29 percent (procera) to 5.44 percent (excelsa) with an average of 1.86 percent. The value of 5.44 percent is the highest value recorded for the family in over 1,000 analyses.

Diagnostic features: Wood dull brown, lusterless; with an average specific gravity of 0.83 (near family average of 0.87). Growth rings lacking or very indistinct. Pores diffuse in most species (radial or echelon in procera). Axial parenchyma banded; narrow. Wood rays 1-4 seriate; heterocellular. Silica commonly abundant and generally evidenced by "saw-burn" on the wood surfaces. Intervessel pitting 4-6 μm in diameter. Bark fine-textured and nonlaminated.

Similar in many respects to Calocarpum but here the axial parenchyma is reticulate. Approaches Pouteria in some respects but here the intervessel pitting is 6-8 or 8-10 μ m in diameter.

Notes

1. Lucuma ephedrantha A. C. Smith (8) was described in 1936 and transferred to Calocarpum sp. by Baehni (4) in 1942. Wood specimens available for this study were from the type tree (Krukoff 5422) from Acre Territory and a second specimen, Krukoff 5163 from Amazonas. It is interesting to note that Smith stated "It is a species which falls into Pierre's genus Urbanella, related to Lucuma procera Mart." Anatomically it does not belong to Calocarpum as indicated by Baehni but to Urbanella.
2. Lucuma excelsa A. C. Smith (8) was described in 1936 and transferred to Pouteria excelsa (A. C. Smith) Baehni (4) in 1942. Aubréville (2) made the new combination Urbanella excelsa (A. C. Smith) Aubr. in 1963. This species is represented in this study by wood from the type tree (Krukoff 5177) and several others.
3. Urbanella procera (Mart.) Pierre is the generic type and is represented here by three specimens from Bahia: Curran 14, 25, and Froes 886.
4. Lucuma chiricana Standley (10) was described from Cooper & Slater 254 (the type) and Cooper & Slater 230, both of which were without flowers. The floral description was based on Cooper 445 or 457 (5) and on the basis of the wood specimens from these trees, they are neither Pouteria nor Urbanella and belong elsewhere. On the basis of the wood anatomy, this author has accepted Cooper & Slater 254, 230, and Forgeson 69A as belonging to Urbanella. Baehni (4) made the new combination Pouteria chiricana (Standley) Baehni but of "uncertain status." Cronquist (5) added the floral description which has been perpetuated by Pilz (7).
5. Lucuma izabalensis Standley (9) was described from sterile material (Whitford & Stadtmiller 35) collected in Guatemala. Baehni (4) made the new combination Pouteria izabalensis (Standley) Baehni providing a floral description and citing also J. Record 8841, which is the Yale wood collection. The citation should have been Record G-10. Cronquist (5) cited Englesing 46 from Nicaragua and several others in addition to the preceding. Anatomically, the three wood specimens available for this study, including wood from the type tree, belong to the "Calocarpum group" and specifically to Urbanella.
6. Lucuma sclerocarpa Pittier was based on a collection made by Pittier 4357 in Panama. It is still definitely known only from this type collection with accompanying wood specimens. Baehni (4) excluded this specimen from consideration in Pouteria and regarded it as Calocarpum sp. Cronquist (5) referred this specimen to Pouteria making the new combination P. sclerocarpa (Pittier) Cronquist. Lundell (6) made the new combination Calocarpum sclerocarpum (Pittier) Lundell in 1976. The wood anatomy is that of Urbanella rather than Calocarpum.

7. Pouteria cooperi Cronquist (5) was described from Cooper 499, which is still only known from the type collection in Panama. Cronquist had placed this species in his "Calocarpum group" and in 1976 Lundell (6) made the new combination Calocarpum cooperi (Cronquist) Lundell. On the basis of the wood anatomy and bark characteristics this specimen is like Pouteria (sensu Aubréville) rather than Calocarpum or Urbanella.

8. For a comparison with Calocarpum see the earlier paper in this series, FPL Res. Pap. 329 (1978).

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Table 1.--Selected measurements of specimens examined^{1/} --Urbanella

	Collector and number	Sp. gr.	Si	MPD	VML	FL	IV	R	MBH	Source
			%	μ m	μ m	mm	μ m		μ m	
<u>ephedrantha</u>	Krukoff 5163	0.81	1.46	165	780	1.55	6	2	339	Brazil
	Krukoff 5422	0.80	0.65	158	650	1.39	6	2	173	Brazil
<u>excelsa</u>	Capucho 589	0.92	5.44	165	700	1.43	6	2	260	Brazil
	Froes 106	0.65	1.39	142	580	1.03	4	4	394	Brazil
	Krukoff 5177	0.89	0.78	165	860	1.68	6	3	315	Brazil
	Krukoff 5397	0.82	3.02	165	660	1.35	6	3	355	Brazil
	Krukoff 5534	0.78	2.00	173	700	1.51	6	3	434	Brazil
	Rosa, N. A. 219		1.90	158	720	1.56	6	2	118	Brazil
	Rosa, N. A. 617			173	630	1.32	6	4	315	Brazil
<u>procera</u>	Curran 14	0.88	1.79	110	680	1.69	4-5	2	339	Brazil
	Curran 25	0.89	0.88	134	680	1.45	6	2	252	Brazil
	Froes 886	0.92	0.29	102	860	1.32	4-5	2	339	Brazil
<u>chiricana</u>	Cooper & Slater 230	0.81	1.20	158	710	1.35	5-6	2	158	Panama
	Cooper & Slater 254	0.76	3.80	134	660	1.55	5-6	3	291	Panama
	Forgeson 69A	0.96	1.61	158	700	1.52	4-6	2	118	Panama
<u>izabalensis</u>	Englesing 46	0.81	1.54	134	710	1.54	4-6	3	355	Nicaragua
	Record G-10	0.82	2.10	158	820	1.58	4-6	3	315	Guatemala
	Whitford & Stadtmiller 35	0.88	1.99	134	710	1.52	4-6	3	473	Guatemala
<u>sclerocarpa</u>	Pittier 4357	0.77	1.72	142	620	1.18	4-5	2	134	Panama

^{1/} Sp. gr. = specific gravity; Si = silica content; MPD = maximum tangential pore diameter; VML = vessel member length average; FL = fiber length; IV = intervessel pit diameter; R = maximum ray seriation; MBH = maximum body height of multiseriate portion of wood ray. Silica analysis by Martin F. Wesolowski, Chemist, FPL.

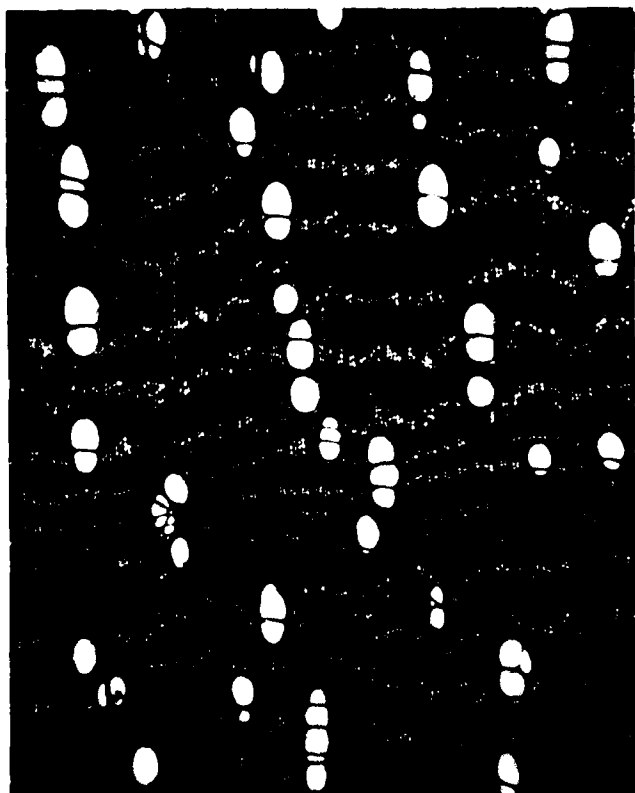


Figure 1.--Urbanella excelsa, pore and parenchyma arrangement (Krukoff 5177 (Type), Amazonas, Brazil) X 30.



Figure 2.--Same as figure 1, tangential section X 110.

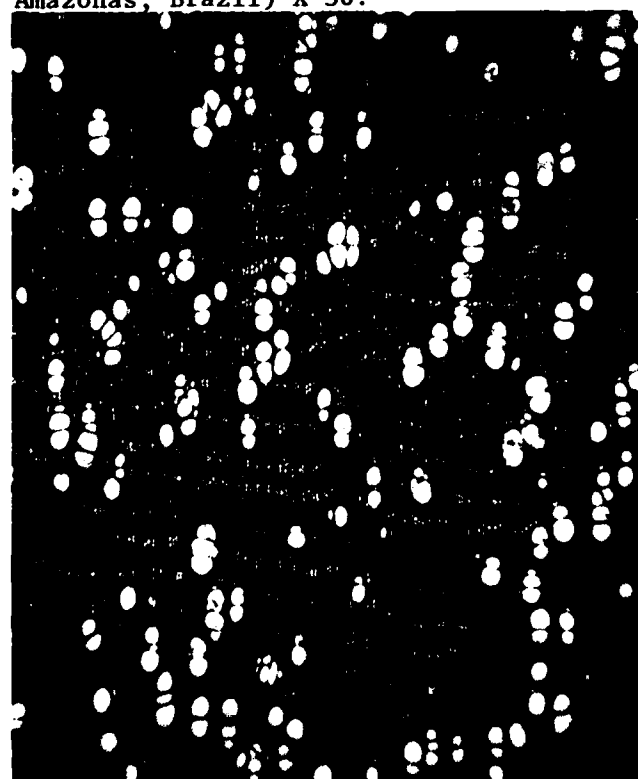


Figure 3.--Urbanella procera, pore and parenchyma arrangement (Curran 14, Bahia, Brazil) X 30.



Figure 4.--Same as figure 3, tangential section X 110.

U.S. Forest Products Laboratory

Wood anatomy of the neotropical Sapotaceae: XXXV.

Urbanella, by B. F. Kukachka, FPL.

6 p. (USDA For. Serv. Res. Pap. FPL 423).

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